Abstract Submitted
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Aerotaxis in Bacterial Turbulence VICENTE FERNANDEZ, ANTOINE BISSON, CINDY BITTON, Massachusetts Institute of Technology, NICOLAS WAISBORD, University of Lyon, STEVEN SMRIGA, ROBERTO RUSCONI, ROMAN STOCKER, Massachusetts Institute of Technology — Concentrated suspensions of motile bacteria exhibit correlated dynamics on spatial scales much larger than an individual bacterium. The resulting flows, visually similar to turbulence, can increase mixing and decrease viscosity. However, it remains unclear to what degree the collective dynamics depend on the motile behavior of bacteria at the individual level. Using a new microfluidic device to create controlled horizontal oxygen gradients, we studied the two dimensional behavior of dense suspensions of *Bacillus subtilis*. This system makes it possible to assess the interplay between the coherent large-scale motions of the suspension, oxygen transport, and the directional response of cells to oxygen gradients (aerotaxis). At the same time, this device has enabled us to examine the onset of bacterial turbulence and its influence on the propagation of the diffusing oxygen front, as the bacteria begin in a dormant state and transition to swimming when exposed to oxygen.

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